THE CONSERVATIVE TREATMENT OF FRACTURES OF THE FEMUR.

NOTE ON THE END-RESULTS OF SIXTY-ONE FRACTURES OF THE FEMUR CONSERVATIVELY TREATED.

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THERE is at present a manifest tendency towards the operative treatment of recent fractures of the long bones, even when the fractures are not compound. Fractures of the femur, which are generally recognized as the most serious of all such fractures in regard both to their immediate mortality and their ultimate results, appear to offer no exception to this modern tendency, which some surgeons would even dignify by erecting into a rule of practice. It seems incumbent, however, on those who thus seek to alter the traditions of surgery either to demonstrate the evil results which they regard as a necessary consequence of accepted methods, or to bring forward proof that by operation still better results can be obtained, and without unjustifiable risk to the patient. The advocates of operative treatment, in short, should either be able to show that the methods they propose will not increase the immediate mortality, and will greatly diminish or altogether prevent the unfavorable results of conservative treatment; or, failing this, they should at least convince conservative surgeons that the functional results of the accepted forms of treatment are such as can no longer be tolerated.

Sir Thomas Myles (Med. Press and Circular, 1907, lxxxiv, 35), speaking recently of fractures of the femur, said:

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"My own experience of the result of routine treatment in these cases is not very encouraging. I have found that in nearly all cases occurring in adults there has been considerable shortening and consequent lameness, some stiffness in the knee-joint, some limitation of the movements of rotation at the hip-joint, a varying degree of muscular atrophy, pain with changes in the weather, and almost always an ugly knob of callus to be felt or seen at the seat of the united fracture. . . . At first I felt inclined to blame myself for these results, but further study of the subject soon taught me that they are the invariable and inevitable results of the methods of treatment usually adopted." He adds that it has hitherto been an accepted fact "that shortening of an inch or two is the inevitable outcome of such injuries, and that nothing can be done to prevent it." In support of these positive assertions he calls to witness museum specimens and skiagraphs; but in regard to such testimony we think it should be borne in mind that the former are selected as curios, and hence the chief desideratum is the presence of deformity and exuberant callus; while skiagraphs are notorious for exaggerating any deformity which may exist. Moreover, Myles presents no details of the end-results of the operative treatment which he so vehemently urges.

Among other surgeons who are champions of the operative treatment of recent fractures may be mentioned Lane and Knaggs, in England, and Vaughan and Martin, in this country.

König (Arch. f. klin. Chir., 1907, lxxxiii, 1032) favors operative treatment for recent fractures of the cervix, the trochanters, and for supracondylar fractures; fractures of the shaft he thinks may give quite satisfactory results under conservative treatment.

Bardenheuer (Die allgemeine Lehre von den Fracturen u. Luxationen, Stuttgart, 1907, 304), on the other hand, does not favor operative treatment at all; he calls attention to the fact that in spite of the advances in aseptic technic Tuffier among 22 such operations had 3 to suppurate.

The end-results under conservative treatment have not received much attention, with the exception of those of the neck of the femur; most surgeons are content with the "general impression" they have received from the results of the cases under their treatment. In fractures of the cervix femoris the prognosis as to ultimate function has generally been regarded as gloomy; but Mr. Bryant (cited by Stimson: Fractures and Dislocations, New York and Philadelphia, 1899, 326) was much more optimistic as to these patients than most surgeons; on more than one occasion he said that all his hospital cases of fracture of the cervix for many years (42 cases, average age 70 years) "went out with good and useful limbs"; a statement, which, as Stimson remarks, indicates much better results than have been reported elsewhere, even if the standard of "good and useful" is only that the patient can stand and walk a little with the aid of a cane. But it may be recalled that Dr. Le Conte, before the Philadelphia Academy of Surgery (ANNALS OF SURGERY, 1905, ii, 284), stated his impression that 80 per cent. of his patients with intracapsular fracture were discharged "with useful and valuable legs."

Scudder (Treatment of Fractures, Philadelphia, 1907, 6th ed., 336) reports the end-results of 16 fractures of the neck of the femur treated at the Massachusetts General Hospital. Only three of these patients were over 60 years of age at the time of the accident. Only two patients had functionally useful limbs, while thirteen had to use a crutch, a cane, or had disability in going up and down stairs. J. B. Walker (ANNALS OF SURGERY, 1908, i, 84) has recently published an investigation of 112 cases of fracture of the neck of the femur treated at the Bellevue Hospital, New York. There were 18 deaths, an immediate mortality of 16 per cent. (a number of patients, also, were transferred in a few days to other institutions; if these were included the mortality would probably be higher); 10 patients were still under treatment in the wards; 32 could not be traced; and of the 52 patients who were traced, no less than 30 (57.6 per cent.) were found to be incapacitated, 12 were still compelled to use a cane, and only 10 (less than one out of five) could do their normal work.

Certainly there is a marked divergence between the results reported by Scudder and by Walker, and those observed by Bryant and by Le Conte.

As a contribution to this subject we have studied 121 recent fractures of the femur which have been under treatment in the Episcopal Hospital during the last three years; and we take this opportunity to acknowledge the courtesy of the staff in permitting us to examine their case-records and their patients. Although there have also been admitted during this time a few patients with ununited fractures of the femoral neck, these have not been included in our statistics, as the object was merely to ascertain the end-results of conservative treatment of recent fractures.

The following classification has been adopted:

Region of Femur Involved.	Condition on Discharge.
Cervix, 58 cases	Cured, 20 patients; improved, 20 patients; not improved, 2 patients, died, 16 patients.
Trochanteric, 13 cases	Cured, 12 patients; improved, 1 patient; died, 0 patient.
Shaft, 32 cases	Cured, 26 patients; improved, 1 patient; died, 5 patients.
Condyles, 18 cases	Cured, 15 patients; improved, 2 patients; died, 1 patient.

There has been no distinction made in our figures between intra- and extracapsular fractures of the neck of the thigh-bone. It is distinctly stated in only two cases that the fracture (cervix) was still ununited on discharge; but it is possible that no union was present in 8 other patients. It is reasonably certain, however, that firm union (probably not bony in all cases) was secured in 29 patients (69 per cent. of those who recovered). We have classed as trochanteric both fractures "through the trochanters" and "subtrochanteric" fractures; and among fractures of the condyles are included, besides 15 typical "supracondylar" fractures, also 2 cases of fracture through the external condyle, and 1 case of compound epiphyseal separation, all three of the last-named fractures involving the knee-joint.

The mortality among these 121 cases was 18.1 per cent.

CAUSES OF DEATH.

The causes of death may be seen in the following table:

Cervix, 16 deaths, mortality 27.6 per cent.: shock, 2 patients; pneumonia, 3; decubitus, 3; exhaustion, 5; uræmia, 1; cancer of the pylorus, 1; enlargement of prostate, 1. (Age varied from 59 to 84 years, 11 patients being over 70 years; and the period until death varying from 1 day to 10 months).

Trochanteric, no deaths.

Shaft, 5 deaths, mortality 15.6 per cent.: other injuries, 3 patients, aged 76, 51, and 60 years; delirium tremens, 1, aged 33 years; pneumonia, 1, aged 71 years, after five days.

Condyles, 1 death, mortality 5.5 per cent.: œdema of lungs, 1 patient, aged 66 years.

With the exception of the fractures of the neck of the femur there was only one fracture in which on discharge firm bony union had not taken place. This patient, a woman aged 65 years, with a fracture at the junction of the middle and lower thirds of the shaft, went home over ten weeks after admission, wearing a plaster cast, with fibrous union. It has been impossible to trace her since her discharge more than two years ago. Several skiagraphs made while she was under treatment showed good apposition of a nearly transverse fracture.

The treatment adopted has been so various as to be fully representative. While all the surgeons employ longitudinal traction by means of Buck's extension apparatus, some use only sandbags in addition; others will have none of sandbags, but employ Volkmann's sliding splint; and some are partial to the double inclined plane, Smith's anterior splint, and other more complicated appliances. A number of the fractures of the neck of the femur have been treated with encouraging results by both longitudinal and lateral traction, as advocated in 1869 by Phillips (Amer. Jour. Med. Sciences, 1869, lviii, 398), and as recently popularized by Maxwell, Ruth, and others.

The ages of these patients varied from 4 months to 86 years.

Notices were sent to all of the 99 patients who recovered. Of these, 29 returned to the hospital for examination; 17 were examined at their homes; and accurate accounts of the present condition of 15 were received from their family or friends. It was impossible to trace 37 patients. There are thus available for our report 61 patients showing the end-results of treatment.

Contrary to our expectation, the ultimate results in those patients who did not return for examination were as good as, and in some instances better than, those in the patients who came to the hospital. Thus one old lady of nearly 70 years, with fracture of the neck of the femur, was found busy housecleaning, having just moved all her parlor furniture into the front hall and vestibule. Other patients were visited at their places of employment, and were found too hard at work to spare the time to return to the hospital for examination.

We have classed the functional end-results under the following headings: (1) Perfect functional result, which, without regard to shortening, implies the entire absence of limp, and of any hindrance to the normal use of the limb. It should be stated, however, that none of these patients were acrobats, either before or after their injury. (2) No disability but limp. (3) Marked impairment of function, which implies that the limp was decided, and that in some cases the use of a cane, and in a few the use of a crutch, was still necessary, although even these patients were by no means helpless. Thus one patient (cervix), included in this class of "marked impairment of function," uses a crutch on the street, a cane at home, goes up and down stairs constantly, and supports herself by the use of a sewing machine, which she runs with either foot indifferently. (4) Incapacitated, which implies that the patient has to use two crutches, or is confined to the house.

The end-results of the 61 cases may be thus tabulated:

END-RESULTS OF SIXTY-ONE CASES OF FRACTURE OF THE FEMUR TREATED CONSERVATIVELY.

Site of Fracture.	Cases Treated.	Cases Recovered.	Cases Traced.	I. Perfect Functional Result.	II. No Disability but Limp.	III. Marked Impairment of Function.	IV. Incapacitated.
Cervix	58	42	21	5	8	6	2
Trochanteric	13	13	9	5	2	2	0
Shaft	32	25	22	14	8	0	0
Condyles	18	17	9	4	3	0	2
Total	121	99	61	28	21	8	4

Forty-one patients were examined for shortening; the results are shown in the accompanying table:

SHORTENING.

Site of Fracture.	No. of Patients Measured.	No Shortening.	Shortening less than				
			1 cm.	2 cm.	2.5 cm.	4 cm.	5 cm.
Cervix	12	1	3	3	2	2	1
Trochanters	6	1	2	.	1	.	2
Shaft	17	5	8	4	.	.	.
Condyles	6	1	.	1	.	3	.
Total	41	8	13	8	3	5	4

Among 41 patients measured, 8, or about one-fifth, recovered without shortening; 32, or 78 per cent., had less than one inch shortening; none of the patients had more than two inches shortening; and none of the patients with fractures of the shaft itself had more than three-fourths of an inch shortening.

Speaking of fractures of the femoral neck alone, we found entirely useful limbs in 13 out of 21 cases traced, or in nearly 62 per cent. Only two patients were entirely incapacitated: one of these, a woman 80 years old, was discharged with an ununited fracture, and died at her home three weeks later; the other patient, a man 78 years old, was living six months after the accident. The average age of the 21 patients traced was over 57 years at the time of the accident; or, if two children of 11 and 15 years be excluded, the average age of 19 patients was over 62 years; 12 patients were actually more than 60 years old at the time of the accident, and 7 of these were over 70 years. Of the 21 patients with fracture of the neck of the femur who were not traced, the average age was 64½ years, 10 of the patients being over 70 years of age. The difficulty of tracing them was no doubt due in part to some of them being dead.

Taking all the remaining fractures together, excluding those of the cervix, there were 40 patients traced. Of these, 36 (90 per cent.) had entirely useful limbs, though 13 of them had a limp. There was marked impairment of function in 2 patients (trochanteric fractures), one of whom, aged 70 years, had had the same femur fractured once before, three months previously; and the other, aged 65 years, sustained, besides the fracture through the trochanters, a Pott's fracture of the same leg. Two patients in this group were found to be incapacitated; both had supracondylar fractures—one, aged 55 years, had previously sustained a fracture of the neck of the same femur, which had united with shortening and deformity; he still uses crutches, over 18 months after his discharge;—the other patient, a woman of 62 years, has advanced rheumatoid arthritis affecting both knees and both hips; she is barely able to totter around her house.

We may conclude, then, that, with the exception of these four patients, the results of the conservative treatment of fractures of the femur, excluding those of the neck, were satisfactory; and we very much doubt whether operative treatment of such cases could do more than give entirely useful limbs in 90 per cent. of cases, and leave only one out of every three patients with no other functional impairment than a limp.

FRACTURES OF FEMUR, EPISCOPAL HOSPITAL. PATIENTS TRACED, 1905-1907 INCLUSIVE.

CERVIX.

1. Matthew G., 64 yrs., July, 1907. Examination 2–12–'08. Habitually uses crutch and cane. Can walk without support of any kind. Goes up and down stairs daily. Is still improving. Shortening 3 cm.; eversion; rotation fair. Abduction possible to 30°, flexion to 135°. Union firm. (Class III.)

2. Irene K., 11 yrs., January, 1904. Report 5–13–'08. No limp; all functions perfect. (Class I.)

3. Mary E., 72 yrs., January, 1905. Report 1–21–'08. Can walk with crutches; goes up and down stairs daily. Was treated by longitudinal and lateral traction. (Class III.)

4. John M., 53 yrs., February, 1905. Examination 1–25–'08. Scarcely appreciable limp. Rotation a little restricted; flexion to 90°; abduction to 10°. Union firm. Shortening 1 cm. (Class II.)

5. Chas. M., 35 yrs., December, 1905. Examination 2–10–'08. No perceptible limp. Shortening 2 cm. Flexion normal; rotation normal; hardly any abduction possible. Was treated by longitudinal and lateral traction. (Class I.)

6. Margaret B., 50 yrs., January, 1907. Examination 2–10–'08. Uses cane on street. Marked limp without cane. Eversion slight; rotation fair; abduction and flexion normal. Union firm. Shortening 2 cm. Was not brought to hospital until 5 weeks after injury in 1907. (Class III.)

7. Jane C., 65 yrs., March, 1907. Examination 5–13–'08. Moderate limp; no disability; good union. Found at her home housecleaning, and moving furniture around. (Class II.)

8. Lena M., 56 yrs., February, 1907. Examination 1–23–'08. Habitually uses two crutches, but can walk with only one cane. Very little limp when using cane. Goes up and down stairs easily. Firm union. Shortening 4 cm. (Class III.)

9. Eliza K., 70 yrs., June, 1905. Examination 4–2–'08.

Slight limp, no cane. Goes up and down stairs often each day, but not leg over leg. Eversion slight, rotation slight, abduction to 18°, flexion to 90°. Union firm. Shortening 1 cm. (Class II.)

10. Pauline T., 55 yrs., January, 1906. Examination 3–23–'08. Decided limp; uses one crutch on street, one cane at home. Goes up and down stairs constantly; uses sewing machine all day, working it with either foot indifferently. Rotation good; flexion to 90°, abduction to 20.° Union firm; shortening 2.5 cm. Was treated by longitudinal and lateral traction. (Class III.)

11. Anna C., 35 yrs., March, 1906. Report 5–13–'08. Marked limp, moderate outward rotation; perfect use. (Class II.)

12. Charles W. S., 70 yrs., June, 1906. Examination 4–20–'08. No limp, no disability of any kind. All functions normal. No shortening. X-ray showed fracture through base of cervix. (Class I.)

13. Mary G., 58 yrs., October, 1906. Examination 5–16–'08. Moderate limp; flexion to 90°; slight eversion. Union firm; shortening 5 cm. Scarcely any disability. (Class II.)

14. Jane McC., 78 yrs., May, 1905. Examination 5–20–'08. Very little limp; scarcely any disability. Union firm. No eversion. Shortening 2 cm. (Class II.)

15. Margaret G., 80 yrs., December, 1905. Report 5–20–'08. Died about three weeks after discharge; never left bed after return from hospital. Recorded in hospital records as "unimproved." (Class IV.)

16. Joseph S., 62 yrs., August, 1905. Report 5–23–'08. Moderate limp; always uses cane. Works as watchman. (Class III.)

17 Catharine B., 63 yrs., November, 1907. Report 5–23–'08. Scarcely appreciable limp; no disability at all. Fracture was impacted. (Class II.)

18. John B. M., 15 yrs., October, 1906. Examination 4–20–'08. No limp; flexion to 15° beyond right angle; abduction 5°; shortening 2.5 cm. Typical case of traumatic coxa vara. (Class I.)

19. Joseph K., 68 yrs., July, 1907. Examination 4–20–'08. No appreciable limp; slight eversion; flexion to 15 degrees beyond right angle; abduction 10°. Shortening 0.75 cm. Works as blacksmith. (Class I.)

20. Maxwell L., 78 yrs., October, 1907. Report 4–20–'08. Incapacitated; unable even to use crutches. (Class IV.)

21. Lydia L., 75 yrs., April, 1905. Report 5–28–'08. Died of pneumonia in January, 1907, nearly two years after fracture of hip. Until within a few days of death walked with scarcely appreciable limp, and with no disability. (Class II.)

THROUGH OR BELOW TROCHANTERS.

1. Gottlieb F., 45 yrs., December, 1905. Examination 5–16–'08. No limp; no deformity. Shortening 1 cm. (Class I.)

2. Carrie M., 12 yrs., June, 1906. Examination 5–16–'08. No limp; no shortening. Treated on double inclined plane. (Class I.)

3. Thomas H., 60 yrs., August, 1906. Examination 5–13–'08. No limp; no disability. Had double fracture of femur. (Class I.)

4. Daniel H., 40 yrs., May, 1907. Examination 4–20–'08. Moderate limp; works as rigger at Cramp's shipyard; climbs ladders constantly. Upper fragment slightly displaced forward. Shortening 4.5 cm. (Class II.)

5. Joseph Q., 57 yrs., September, 1906. Examination 4–20–'08. Limp not noticeable; flexion to 15 degrees beyond right angle. Shortening 1 cm. (Class I.)

6. Bernhard P., 43 yrs., March, 1905. Examination 2–6–'08. No perceptible limp; rotation slightly restricted; all other functions normal. Slight thickening through trochanters. Shortening 2.5 cm. (Class I.)

7. Joseph S., 69 yrs., December, 1905. Report 5–13–'08. Very slight limp; all functions normal. (Class II.)

8. Susan D., 70 yrs., July, 1907. Examination 1–4–'08. Walking with cane; slight limp. Had fractured same femur three months before admission for recent refracture. (Class III.)

9. Annie D., 65 yrs., March, 1906. Examination 5–23–'08. Walks around house without crutch; goes up and down stairs several times daily. Marked limp. Shortening 4.5 cm. Had also Pott's fracture of same leg, at same time as fracture of femur. (Class III.)

SHAFT.

1. Harry M., 6 yrs., September, 1905. Report 5–16–'08. No limp; all functions perfect. (Class I.)

2. Franklin C., 18 yrs., September, 1905. Examination 2-6-'08. Scarcely perceptible limp; all functions normal. Shortening 1 cm. (Class II.)

3. Robert L., 53 yrs., October, 1905. Report 5-16-'08. No limp; no disability; wife cannot tell which was the injured side. (Class I.)

4. John B., 13 yrs., October, 1905. Examination 1-28-'08. No limp, all functions normal. Shortening 1 cm. (Class I.)

5. John R., 34 yrs., November, 1905. Examination 3-19-'08. No limp; all functions normal except flexion of knee, which is impossible beyond 35 degrees more than right angle. Shortening 1 cm. Some callus at site of fracture, which was comminuted. (Class I.)

6. Harry D., 7 yrs., February, 1906. Examination 3-19-'08. Very slight limp; all functions normal. No shortening. Limp probably due to fracture of lower third of leg bones on same side, sustained since recovery from fracture of femur. (Class II.)

7. Geo. M., 54 yrs., May, 1906. Examination 5-16-'08. No limp; all functions normal. No shortening. (Class I.)

8. Fred. K. C., 41 yrs., June, 1906. Examination 4-18-'08. Slight limp; all functions normal. Shortening 0.5 cm. Had same hip injured again shortly after discharge from hospital. (Class II.)

9. Benjamin S., 27 yrs., August, 1906. Report 5-16-'08. Slight limp; all functions normal. (Class II.)

10. John K., 15 yrs., January, 1907. Examination 4-18-'08. No limp; all functions normal. Shortening 1.5 cm. Was crushed in elevator, sustaining contusions of pelvis, fractures of left femur, and of middle third of both bones of left leg. (Class I.)

11. John M., 43 yrs., November, 1906. Examination 5-16-'08. Slight limp; all functions normal; shortening 2 cm. Had also fracture of olecranon. (Class II.)

12. George D., 53 yrs., November, 1906. Examination 4-18-'08. Slight limp; flexion of hip only to 10° beyond right angle; all other functions normal. Shortening 1 cm. When 7 years of age had extensive operation on this femur for osteomyelitis. (Class II.)

13. James H., 10 yrs., May, 1907. Examination 4-21-'08. No limp; all functions normal. Shortening 1 cm. (Class I.)

14. William H., 30 yrs., June, 1907. Examination 5-13-'08.

No limp; all functions normal. Shortening 0.5 cm. Had also fractures of both forearms, compound comminuted of left; concussion of brain; and delirium tremens. (Class I.)

15. Albert F., 4 months, September, 1907. Examination 4-21-'08. No deformity; functions all normal. No shortening. (Class I.)

16. John F., 15 yrs., October, 1907. Examination 4-23-'08. No limp; all functions normal. Upper fragment is displaced slightly outwards. Shortening 1.5 cm. (Class I.)

17. William M., 49 yrs., November, 1904. Report 5-18-'08. Committed suicide one year ago. Still had slight limp, but no other disability. (Class II.)

18. Annie K., 70 yrs., December, 1904. Examination 5-18-'08. No limp, no disability. Shortening 1 cm. (Class I.)

19. John S., 8 yrs., May, 1907. Examination 5-18-'08. No limp; all functions normal. Shortening 1.5 cm. (Class I.)

20. Joseph C., 5 yrs., November, 1907. Examination 5-18-'08. No limp; all functions normal. No shortening. (Class I.)

21. Joseph G., 16 yrs., March, 1906. Report 5-23-'08. Very slight limp; no disability at all. Same femur broken twice. (Class II.)

22. Marie K., 2 yrs., August, 1906. Examination 5-23-'08. No limp; all functions perfect. No shortening. (Class I.)

SUPRACONDYLAR.

1. Ungar D., 29 yrs., July, 1905. Report 5-16-'08. Had slight limp two years ago. (Class II.)

2. Samuel M., 44 yrs., September, 1905. Examination 1-30-'08. Scarcely perceptible limp; full extension, but flexion only to 10 degrees beyond right angle. Shortening 3 cm. This was a fracture through the external condyle, involving the knee-joint; and the patient had had a fracture through lower third of same femur five years before this injury. (Class I.)

3. Arthur D., 7 yrs., January, 1906. Examination 3-19-'08. No limp; not quite complete extension of knee. No shortening. This was a compound epiphyseal separation. (Class I.)

4. Nellie S., 27 yrs., February, 1907. Examination 5-16-'08. No limp; flexion of knee only to right angle; all other functions

normal. Shortening 2 cm. This was a fracture of external condyle, involving joint. (Class I.)

5. Mrs. W., 63 yrs., March, 1907. Examination 5–13–'08. Marked limp; no disability. Shortening 3 cm. (Class II.)

6. John D., 45 yrs., December, 1907. Examination 4–21–'08. Marked limp; all functions normal. Lower fragment is posterior and external. Wears heel three-quarters of an inch high. Shortening 4 cm. (Class II.)

7. William M., 65 yrs, April, 1905. Examination 5–20–'08. No limp; no disability. Shortening 5 cm. (Class I.)

8. Hannah C., 62 yrs., May, 1905. Examination 5–20–'08. Crippled by rheumatoid arthritis in knees and hips; barely able to walk; has not been out of house since return from hospital. Does no work. Right knee is more stiff and disabled than the fractured knee. (Class IV.)

9. James McC., 55 yrs., October, 1906. Report 5–20–'08. Incapacitated; still uses one crutch and cane. This fracture involved knee-joint; and the patient had previously had a fracture of cervix of same femur, which had united with shortening and deformity. (Class IV.)